

**ABSTRACT OF THE DISCLOSURE**

A reactor and a process for solid phase continuous polymerisation of polyethylene terephthalate (PET) in order to achieve an increase of the intrinsic viscosity (I.V.) of a low molecular weight PET pre-polymers flow. A plurality of fluidised stages in series (109; 309) are provided and said PET pre-polymers flow is fed into said fluidised stages in series (109; 309). An inert gas flow is fed either in cross-flow or in counter-current flow with respect to the PET pre-polymers flow.